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# THE SCHOOL REVIEW

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## RELATION OF INDUSTRIAL TO GENERAL EDUCATION

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### CULTURE AND DISCIPLINE

By general education is meant that which deals at least in outline with all the essentials of complete living. It embraces not only language and mathematics, but also science, art, and history. It includes, moreover, not only knowledge of these essentials, but also efficiency in the application of this knowledge to the corresponding affairs of life. The two words by which it conjures are *culture* and *discipline*, even if it does not always define what it means by them. Culture is a product of insight, and discipline of training to efficiency. By insight is meant the intellectual apprehension involved in mastering a system of ideas. Insight in the study of a language includes more than the power to construe and translate, for it embraces also a perception of the value of the study as seen in literature, history, and art. In chemistry it means not only a grasp of chemical laws as such, but also of the significance of these laws in the organic, the inorganic, and above all in the economic world. Men long since observed that out of this ever broadening insight into the relations of things there grows a refining influence which affects speech, emotions, and conduct, and this result it calls *culture*. Culture may therefore be defined as the total refining effect—intellectual, emotional, and volitional—produced by insight into

what is learned. The quality of culture depends upon the nature of the subject-matter, that arising from one study, say language, differing from that of another, say biology, or mathematics. The quantity of the culture depends upon the scope and depth of the insight; for an insight into language, mathematics, science, history, and art gives a broader culture than the study of any one or two of them alone, while a deep insight is proportionally more cultural than a shallow one. A general education, therefore, provides the conditions for a culture that shall at all events be broad and symmetrical in scope, whatever may be its restrictions in intensity, or depth.

If culture is a product of insight, discipline is a product of the training for efficiency. By *efficiency* is meant the power to use effectively the knowledge involved in insight. A mind is disciplined in language, in mathematics, in science, when it can use effectively the knowledge it has in these subjects. We use language to acquire and to express ideas, mathematics to solve quantitative problems, science to meet adequately the conditions for preserving and enhancing the value of life. The quality of discipline, like that of culture, depends upon the nature of the subject-matter, discipline through the study of linguistics having a very different quality from that acquired through a training in history, art, or biology. The quantity of discipline gained through education depends, likewise, upon the scope and intensity of the training for efficiency. Here again it is apparent that general education provides for all the chief types of discipline, since it trains to efficiency in all the great departments of knowledge.

As an abstract proposition, there can be little doubt that every educated man should have a good solid substratum of the culture and discipline that can be acquired only through study and practice in all the chief representative subjects found in the curriculum, though there always comes a time when general should give place to special training. Some find this at the close of four years of college work, some at the close of two years of such education, some at the close of the high-school period—when most technical students begin their professional education;

while it is conceivable that with large numbers it should be found even before the end of the grammar-school course. President Jordan now declares that an aimless (i. e., a general) education in the university is a useless education, and proposes to eliminate the freshman and sophomore classes from the university over which he presides, requiring all other students to begin at once their special preparation for some particular calling or profession, as in a German university.

It is commonly assumed that industrial, like any branch of special, education is non-cultural and but slightly disciplinary, but this assumption needs qualification, for though in special education insight and efficiency may be restricted in range they are certainly deepened in intensity. This is the educational meaning of concentration of effort to a narrow field. No type of special training can be deemed educative that does not exercise the mind while developing technical skill. Consequently there is no such sharp antithesis between special and general education as has been so often assumed. Both give culture and discipline, for both give insight and skill. The difference is that culture and discipline are more diffused in general and more intensified in special education.

#### POSSIBILITY OF GENERAL THROUGH SPECIAL EDUCATION

Another fact that further softens the opposition between general and special education in their cultural and disciplinary effects is that specialities may be so studied that they have much the same educational value that more general studies have. This is well illustrated in higher education by the comparative method, whereby a specialist often gets a much broader view of the world than at first seems probable. An architect, for example, must know the history of architecture, which is intimately related to the history of art in general to that of peoples. He must be gifted in drawing, trained in mathematics, instructed concerning mechanics, building materials, and heating and ventilating buildings, and he must be trained in original design of the structures he hopes to erect. An engineer in addition to the technique of his profession must know mathematics and the fundamental

natural sciences, and he must be at least acquainted with the social and economic conditions which determine his undertakings. Happily professional coincides largely with general education in the training of the teacher. So, in due measure, all special education which follows the acquisition of the school arts has its own not inconsiderable measure of culture and discipline. The rule should be, general education as long as we can get it; special education as soon as no other will be taken. Under present conditions probably only from one-half to two-thirds of the pupils who enter the elementary schools finish them. Less than one-fifth of those who enter the high school complete the course. What becomes of the eliminated? The answer is that they go, for the most part, to swell the ranks of unskilled labor. Since so large a number of students is involved, it is well worth our while to inquire whether it is not possible so to broaden this more elementary special education that its educational effect may be not unlike that produced in higher education by the comparative method.

The German continuation schools have recognized the value and practicability of this idea, and actually make the instruction in these classes well-nigh as liberalizing in its tendencies as that of a corresponding amount of secondary instruction in the regular schools. This result is effected by moving out in every direction from the center of interest found in the special branch pursued by any given body of students. In the continuation schools at Halle, two years ago, there were thirteen trades and callings represented; in those of Munich about forty. Each of these trades becomes an independent center, from which there radiates a study, not only of the best technique of the subject, but of all closely related phases of business, social, and even political life. To illustrate, we may take the class of bakers' apprentices in the continuation schools at Halle. Their reading-lessons, instead of spreading over the field of general literature, all radiate from the center of their special interest. The first part is devoted to the cereals that are used by the baker in preparing food for men, and opens with a poem by Welcker on "Our Daily Bread." These selections, written in literary style both in prose and verse, pertain

to such subjects as "Grain," "The Food Cereals of Various Peoples," "The Evening Meal," "The Grinding of Grain," "The Invention of Oleomargarine" (with a tribute to Napoleon III), "The Production of Raisins among the Turks," "Almonds," "About Sugar" (its production and use), "Common Salt," "Vanilla." The second part treats of manufacture of bread products from the raw materials. Here the theory and practice of baking in all their essential elements are taken up, including descriptions of implements, ovens, fuels, barns, sanitation, bakeries, all varieties of baked products, the physiological study of breads as diet, poisons, descriptions of great bake-factories, like that of the Shredded Wheat industry in Niagara Falls, etc. The third part presents historical sketches concerning the bakery and its products.

A similar reading-book is prepared for each trade. In like manner, each class has an adequate series of number lessons relating to its special business, somewhat in the form of our commercial arithmetics. Their drawing likewise is made to serve the specific needs of each trade or occupation. In short, everything that is done in these schools starts from and always returns to the specific aim of the given class, yet so many human and scientific relationships are established that the training becomes in large measure general. Climb a mountain peak and the whole cyclorama lies before and beneath you. Climb any other neighboring peak, and though the standpoint has changed, it is still the same landscape.

Need we therefore have a bad educational conscience concerning culture and discipline because special trade or other vocational courses are to be provided for them? It is hard to find any ethical basis for such a state of mind, whether we contemplate the woeful economic and social fate of these millions without such training, or the national results of such waste of economic resources, or the pedagogic desire to impart a special type of culture and discipline to all.

Should the foregoing argument prove to be well founded, we may dismiss most of our scruples concerning the amount and quality of culture and discipline that may be furnished by

rationally conducted special schools, and turn our attention to other aspects of the subject.

#### A NEW TYPE OF EDUCATION NEEDED FOR THE MILLIONS

It is a commonplace of educational thought that in the main the school is now called upon to utilize the time and supply the training once provided by the various forms of industrial labor both rural and urban. The education of more recent generations was both intellectual (for short periods of the year) and industrial, through the performance of useful work. With more remote generations all the training the masses received came through their labor. For reasons well understood, the school has responded to this double demand by doubling the time and quantity of intellectual education, and excluding altogether the industrial element. This is working fairly well for the classes intellectually gifted or economically well endowed. For the masses it works badly chiefly for two reasons: first, because it fails to improve greatly their economic position, and second, because it makes but a feeble appeal to permanent intellectual interests, since it ignores so completely all social experience in the development of insight and efficiency. It abandons natural for artificial stimuli, and then bewails the waste.

The Report of the Massachusetts Commission on Industrial and Technical Education finds that the years from fourteen to sixteen are for the individual in industrial pursuits largely wasted years, since for one thing they yield but a trifling income, but chiefly because they fix the permanent status of the worker in the ranks of unskilled labor. This the commission rightly consider a calamity—not only to the person himself but also to the industrial community itself. To check permanently the intellectual, social, and economic development of large numbers of children is under any circumstances most lamentable, but to do so unnecessarily because our educational system is defective, seems truly deplorable. From 70 to 80 per cent. of the parents of Massachusetts consulted by the commission, testified to their willingness and ability to have extended the education of their children, had the type of education offered, promised to raise the

economic status of its pupils. We must therefore make a new appeal to the youthful mind as soon as the more general one of the present system is exhausted. Law, custom, status in life, wishes of parents and teachers, come in to reinforce native inclinations of the pupil for a broad and liberalizing education. But these sooner or later lose their force, and when they do the new appeal should supplant them. It will have a double force, economic for both pupil and parent, and psychical for the student. Education which unmistakably betters early economic status and opens the road to a better economic career for the future appeals almost irresistibly both to parent and child, while education which takes full cognizance of social stimuli is sure to awaken spontaneous and hearty response. Our success in reclaiming delinquents through schools that give scope to individuality and motor activities proves this. Pupils sometimes run away from the regular schools that they may join the delinquent class where they can find educational stimuli to which they can make a whole-souled and vigorous response—all of which leads to the reflection, that the only boy who can now find the type of education best fitted to his nature is the bad boy. In such an education the mind is stimulated by contact with the important things of everyday life, and mental arises from technical work. The exercise of the larger muscles, as in wood and metal work, gymnastics, industrial drawing, laboratory work in physics and chemistry, precedes and gives rise to those forms of mental response which always result from contact with real situations. In similar manner, a wider knowledge of geography naturally arises from study of the raw materials of commerce, and a more vital attention to literature and history through the reading and acting of literary masterpieces as a relief from the more strenuous duties of the day.

In addition to the technical high schools now here and there provided, which are confessedly only slightly altered schools of general training, we need a parallel system of schools much more distinctly industrial. But perhaps most of all we need a system of such schools that will open their doors to that large contingent



which leave school forever even before the grammar-school course is finished. These might well be called

#### JUNIOR INDUSTRIAL HIGH SCHOOLS

The word *junior* signifies that these schools shall be open to all who have fairly mastered the elementary school arts, say at the completion of the sixth grade, or at the age of twelve for normal pupils, or thirteen or fourteen for those who for one reason or another have been retarded in their school work. The course of study should cover four years, thus graduating the normal student at the age of sixteen.

The first two years would be given up to those studies and exercises which above all others lay the foundation for success in industrial occupations. First and foremost should come industrial drawing both freehand and mechanical. There should be in it not a trace of that barren aestheticism which so often blights this exercise in general schools, but every step should be toward constructive originality in design, or those forms of mechanical constructive skill which gradually develop into architectural, mechanical, and topographical drawing of the highest type, as seen in such institutions as the Brooklyn Manual Training High School.

The second great group of studies in the junior industrial high schools should be those varied fundamental activities known collectively as manual training. By this term is not meant those recreational exercises now held for one or two hours a week to cheer the brain-fagged youth of the general courses, but a solid business occupying from a third to a half of the whole school time. Such training grows naturally out of the constructive drawing, and includes many forms of wood, metal, cloth, and paper work for boys, and dressmaking, millinery, and the elements of domestic science for girls.

Closely associated with these two lines of work, commercial geography and elementary laboratory science will be taught in closest connection with the raw materials of commerce as furnished by the exhibits of the Philadelphia museums. Physics will grow out of the study of mechanical inventions such as are used in transportation, manufacture, and the trades, and those

most common in everyday life, as seen in the household and in the street. Nature-study as an end in itself has no place in such a school, for it does not furnish the right motives, but through a study of its applications science is to be learned. In other words, science is never to be pure, but always applied.

The time for fairy tales and pure literature as an aesthetic end, whether prose or verse, has gone by when these schools are reached, so that literary culture, if it comes at all, will come as a by-product. When cereals are studied, however, we may well follow the example of the German continuation schools and furnish the pupils with a monograph which will in suitable literary form give an account of the raising, grinding, and preparation of grains for food, as above described.

Commercial arithmetic and concrete geometry will be taught during these first two years, to be succeeded by algebra and demonstrational geometry in the last two. No argument is needed to show the practical value of these subjects, whether for immediate success in industrial pursuits or for later promotion to higher educational institutions. Along with the subjects above mentioned, a commercial study of modern foreign languages should be open to every pupil, but not made compulsory. If all we want of a foreign language is the ability to read it we may begin it at any time; but if we expect to use the language as a tool of intercommunication then the American high school begins its study too late. Foreign schools habitually begin such studies at or before the age of twelve. We must do the same if we hope to achieve equivalent results. To have an opportunity of learning German, French, or Spanish by a practical method at this early age will be a boon for all who are later to go into commercial courses, and also for those who will later be promoted to higher technical schools.

Such in briefest outline are the basal studies for the first two years of the Junior Industrial High School. During the next two years, the curriculum of studies and exercises will differentiate in several directions, according to the special needs of the pupils and the demands of the locality in which the school is situated.